Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) ~~Method~~ A method for identifying a specific image ~~(11)~~ and/or a specific audiovisual sequence ~~(2)~~ within ~~any said~~a flow ~~(3)~~ of ~~said~~ images ~~(6)~~ or ~~said~~ audiovisual sequences ~~(7)~~, and in particular with the prospect of being able to identify a proprietary image ~~(4)~~ within the flow ~~(3)~~ and/or of being able to identify a plurality of ~~said~~ proprietary audiovisual sequences ~~(5)~~ within the flow ~~(3)~~;

the method comprising ~~the~~ a step of calculating, for each said image ~~(6)~~, an index appearing in the form of a ordered and finite set ~~(21)~~ of values, and in particular in the form of a characteristic vector ~~(9)~~, encoding the content of the image ~~(6)~~; the index calculation process being hereinafter called the indexing process ~~(39)~~;

the method comprising at least one of:

~~the step of~~ calculating a reference index ~~(10)~~, using the indexing process ~~(39)~~ for the specific image ~~(11)~~, or

~~the step of~~ extracting ~~said~~ reference indexes ~~(10)~~ from the specific audiovisual sequence ~~(2)~~, so as to form a reference set ~~(30)~~ of said reference indexes ~~(10)~~;

in such a way that said reference indexes ~~(10)~~ characteristic of the specific image ~~(11)~~ and/or of the specific audiovisual sequence ~~(2)~~ are thus obtained;

the method additionally comprising the step of calculating an index for the current images ~~(13)~~ of the flow ~~(3)~~, using the indexing process ~~(39)~~ for the current images ~~(13)~~ of the flow ~~(3)~~; the index being hereinafter called the current index ~~(14)~~;

the method additionally comprising the step of comparing the reference indexes ~~(10)~~ with the current index ~~(14)~~ of the current image ~~(13)~~ of the ~~monitored~~ flow ~~(3)~~;

~~characterized in that, the method being such that~~wherein, the indexes appear~~ing~~ in the form of ~~said~~ ordered and finite sets ~~(21a, 21b)~~ of values identified, in the reference index ~~(10)~~

and the current index ~~(14)~~, by a system of coordinates ~~(22)~~, ~~it~~ the method additionally comprises the following steps:

~~the step of~~ defining, for a given coordinate ~~(24)~~ of the system of coordinates ~~(22)~~, a pair of values ~~(25, 26)~~, of which:

[[•]] ~~the~~ a first value ~~(25)~~ of the pair of values is the value appearing in the reference index ~~(10)~~ associated with the given coordinate ~~(24)~~, and of which:

[[•]] ~~the~~a second value ~~(26)~~ of the pair of values is the value appearing in the current index ~~(14)~~ associated with the given coordinate ~~(24)~~,

~~the step of~~ calculating ~~the~~ a bidimensional histogram ~~(27)~~ of the pairs of values ~~(25, 26)~~ obtained for all the coordinates of the system of coordinates ~~(22)~~ of the reference index ~~(10)~~ and of the current index ~~(14)~~,

~~the step of~~ calculating ~~the~~ a discrete entropy of the bidimensional histogram, hereinafter called the entropy of the bidimensional histogram ~~(28)~~,

~~the step of~~ calculating ~~the~~ a discrete entropy of the distribution of the values of the reference index ~~(10)~~ or of the current index ~~(14)~~; the discrete entropy of the distribution of values or the discrete entropy of the current index being hereinafter called the reference marginal entropy ~~(50a)~~ or the current marginal entropy ~~(50b)~~ respectively;

~~in such a way that~~wherein:

the comparison time is thus optimized; and

~~in such a way that it is thus possible~~the reference marginal entropy value or the current marginal entropy value is configured to be added to the reference index or the current index, respectively ~~to add this marginal entropy value to the index~~;

~~the step of~~ calculating a comparison distance ~~(29)~~ between ~~a~~ the reference index ~~(10)~~ and ~~a~~ the current index ~~(14)~~, using the reference marginal entropy ~~(50a)~~, the current marginal entropy ~~(50b)~~ and the entropy of the bidimensional histogram ~~(28)~~;

~~the step of detecting~~ whereby a specific image ~~(11)~~ is detected within ~~a~~ the flow ~~(3)~~, ~~thanks to~~ using the comparison distance, with ~~great~~ precision and ~~extremely fast~~speed, while being robust during major photometric alterations.

2. (Currently Amended) ~~Method~~ A method in accordance with claim 1~~; the method being such that, to calculate~~ wherein the calculation of at least one of ~~an index of a image (6), and in particular a~~ the reference index ~~(10)~~ ~~and~~/or ~~a~~ the current index ~~(14), it~~ comprises the step of resampling the image ~~(6)~~ as an image with fixed dimensions in advance; the resampled image being hereinafter called the normalized image ~~(16)~~;

the method additionally comprising, if the image ~~(6)~~ is a color image comprising levels of colors, ~~the~~ a step of converting the levels of colors of the image ~~(6)~~ to be resampled to levels of grayscale ~~beforehand~~;

wherein the normalized image ~~(16)~~ ~~being~~ is represented by a matrix ~~(19)~~ of said pixel values ~~(17)~~ after discrete quantization of the pixel values;

the method additionally comprising ~~the following steps~~:

~~the step of~~ arranging the values according to a predetermined running order of the positions ~~(18)~~ in the matrix ~~(19)~~, ~~and in particular by concatenating the values of each line of the matrix (19) in the form of a characteristic vector (9),~~ so as to obtain the index.

3. (Currently Amended) ~~Method~~ A method in accordance with one of the claims 1 and 2; wherein the step of calculating ~~a~~ the comparison distance ~~(29)~~ between ~~a~~ the reference index ~~(10)~~ and ~~a~~ the current index ~~(14)~~ ~~being~~ is performed by forming ~~the~~ a ratio between ~~the~~ a sum of the reference marginal entropy ~~(50a)~~ and of the current marginal entropy ~~(50b)~~ reduced by the entropy of the bidimensional histogram ~~(28)~~ as the numerator and ~~the~~ a sum of the reference marginal entropy ~~(50a)~~ and the current marginal entropy ~~(50b)~~ as the denominator.

4. (Currently Amended) ~~Method~~ A method in accordance with claim 3~~; the method being such that~~ wherein, to extract the reference indexes ~~(10)~~ of the specific audiovisual sequence ~~(2)~~ from the specific audiovisual sequence ~~(2)~~, ~~it~~ the method additionally comprises the following steps:

~~the step of~~ initializing a reference set ~~(30)~~ containing the reference indexes ~~(10)~~ of ~~the~~ specific images ~~(11)~~ with the reference index ~~(100)~~ of ~~the~~ a first specific image ~~(110)~~ of the specific audiovisual sequence ~~(2)~~; the reference index ~~(100)~~ of the first specific image ~~(110)~~ of the specific audiovisual sequence ~~(2)~~ constituting ~~the~~ a first reference index of the reference set ~~(30)~~;

the method additionally comprising:

(a) ~~the step of~~ calculating, for each said specific image ~~(11)~~ of the specific audiovisual sequence ~~(2)~~, a temporary current index ~~(31)~~ and ~~of~~ calculating a comparison distance ~~(29)~~ between the temporary current index ~~(31)~~ and ~~the~~ a last reference index ~~(32)~~ added to the reference set ~~(30)~~,

(b) ~~the step of~~ comparing the comparison distance ~~(29)~~ between the temporary current index ~~(31)~~ and the last reference index ~~(32)~~ added to the reference set ~~(30)~~ to a predetermined threshold SE ~~(33)~~;

(c) ~~the step of~~ adding the temporary current index ~~(31)~~ to the reference set ~~(30)~~, if the comparison distance ~~(29)~~ exceeds the predetermined threshold SE ~~(33)~~; the temporary current index ~~(31)~~ becoming the last reference index ~~(32)~~ of the reference set ~~(30)~~;

the method additionally comprising the step of repeating the steps (a) through (c) up to the end of the specific audiovisual sequence ~~(2)~~.

5. (Currently Amended) ~~Method~~ A method in accordance with ~~any of the~~ claims 1 ~~or 2 through 4; the method being such that, for~~ wherein the step of comparing the reference indexes ~~(10)~~ with the current index ~~(14)~~ of the current image ~~(13)~~ of the ~~monitored~~ flow ~~(3), it additionally~~ further comprises the step of comparing the comparison distance ~~(29)~~ to a further predetermined threshold SF ~~(65)~~;

~~in such a way that~~wherein in the case of ~~any~~ said flow ~~(3)~~ of said images ~~(6)~~ the specific image ~~(11)~~ is detected provided that the comparison distance ~~(29)~~ between the reference index ~~(10)~~ of the specific image ~~(11)~~ and the current index ~~(14)~~ is less than the further predetermined threshold SF ~~(65)~~.

6. (Currently Amended) ~~Method~~ A method in accordance with claim 4, the method being ~~more particularly~~ designed for detecting a specific audiovisual sequence ~~(2)~~ within any said flow ~~(3)~~ of said audiovisual sequences ~~(7)~~, the method comprising the ~~following~~ steps of:

(a) ~~the step of~~ initializing a variable T ~~(34)~~ at -1, ~~the step of~~ initializing a variable D ~~(35)~~ at 0,

(b) ~~the step of~~ calculating, for each said reference index ~~(10)~~ of the reference set ~~(30)~~, the comparison distance ~~(29)~~ between the reference index ~~(10)~~ of the reference set ~~(30)~~ and the current index ~~(14)~~; ~~in such a way that~~wherein if the comparison distance ~~(29)~~ is less than a predetermined threshold SD ~~(59)~~, the variable D ~~(35)~~ is increased by one; the condition being hereinafter called the condition for detecting said reference indexes ~~(10)~~;

the method being such that the moment when the first said reference index ~~(10)~~ of the reference set ~~(30)~~ of the specific audiovisual sequence ~~(2)~~ meets the detection condition is hereinafter called the moment of the first detection;

the method additionally comprises the following steps:

(c) ~~the step of~~ assigning to the variable T ~~(34)~~ the time elapsed since the moment of the first detection if the variable D ~~(35)~~ is different from zero,

(d) ~~the step of~~ repeating step (b) until the variable D ~~(35)~~ reaches the predetermined threshold SD ~~(59)~~; or of repeating step (a) if the variable T ~~(34)~~ exceeds a predetermined threshold ST ~~(60)~~,

(e) ~~the step of~~ detecting the specific audiovisual sequence ~~(2)~~ if the variable D ~~(35)~~ reaches the predetermined threshold SD ~~(59)~~.

7. (Currently Amended) ~~System~~ A system for identifying a specific image ~~(11)~~ and/or a specific audiovisual sequence ~~(2)~~ within ~~any said~~ a flow ~~(3)~~ of ~~said~~ images ~~(6)~~ or ~~said~~ audiovisual sequences ~~(7)~~, ~~and in particular with the prospect of being able to identify a proprietary image (4) within the flow (3) and/or of being able to identify a plurality of said proprietary audiovisual sequences (5) within the flow (3);~~

the system comprising at least one of:

~~said~~ first calculation means ~~(38)~~ for calculating a reference index ~~(10)~~ for the specific image ~~(11)~~, using a indexing process ~~(39)~~, or

~~said~~ first computer analysis means ~~(40)~~ for extracting ~~said~~ reference indexes ~~(10)~~ from the specific audiovisual sequence ~~(2)~~, so as to form a reference set ~~(30)~~ of ~~said~~ reference indexes ~~(10)~~;

the system additionally comprising:

~~said~~ reception means ~~(41)~~ for receiving the flow ~~(3)~~ of said images ~~(6)~~ or said audiovisual sequences ~~(7)~~ comprising at least one ~~said~~ specific image ~~(11)~~ ~~and/~~or at least one ~~said~~ specific audiovisual sequence ~~(2)~~,

~~said~~ computer processing means ~~(42)~~ for digitizing the flow ~~(3)~~ of said images ~~(6)~~ or said audiovisual sequences ~~(7)~~;

~~the system being characterized in that,~~wherein the reference index ~~(10)~~ ~~appearing~~ is in the form of ~~a~~ an ordered and finite set ~~(21a)~~ of ~~said~~ values ~~(20a), and in particular in the form of a characteristic vector (9a), encoding the content of the specific image (11);~~

~~in such a way that~~whereby a reference index ~~(10)~~ characteristic of the specific image ~~(11) and/~~or of the specific audiovisual sequence ~~(2)~~ is thus obtained;

the system additionally comprising:

~~said~~ second calculation means ~~(43)~~ for calculating a current index ~~(14)~~ for ~~said~~ current images ~~(13)~~ of the flow ~~(3)~~, using the indexing process ~~(39)~~ for the current images ~~(13)~~ of the flow ~~(3)~~;

the current index ~~(14)~~ appearing in the form of a ordered and finite set ~~(21b)~~ of values, ~~and in particular in the form of a characteristic vector (9b),~~ encoding the content of the current image ~~(13)~~;

the system additionally comprising:

~~said~~ comparison means ~~(44)~~ for comparing the reference index ~~(10)~~ of the specific image ~~(11)~~ with the current index ~~(14)~~ of the current image ~~(13)~~ of the monitored flow ~~(3)~~;

the first calculation means ~~(38)~~ additionally comprising ~~said~~ reference processing means ~~(49a)~~ for calculating ~~the~~ a discrete entropy of the distribution of ~~the~~ values of the reference index ~~(10)~~; the entropy being hereinafter called the reference marginal entropy ~~(50a)~~;

~~in such a way that~~wherein the comparison time is thus optimized; and

~~in such a way that this said~~the reference marginal entropy value ~~(50a)~~ ~~can thus~~is configured to be added to the reference index ~~(10)~~;

the second calculation means ~~(43)~~ additionally comprising ~~said~~ current processing means ~~(49b)~~ for calculating ~~the~~ a discrete entropy of the distribution of ~~the~~ values of the current index ~~(14)~~; the discrete entropy of the distribution of the values of the current index being hereinafter called the current marginal entropy ~~(50b)~~;

~~in such a way that~~wherein the comparison time is thus optimized; and

~~in such a way that this~~the current entropy value ~~can thus~~is configured to be added to the current index ~~(14).~~;

~~the system being such that~~wherein, the reference indexes ~~(10)~~ and the current indexes ~~(14)~~ ~~appearing~~ are in the form of ~~said~~ ordered and finite sets ~~(21a, 21b)~~ of values identified, in the reference index ~~(10)~~ and the current index ~~(14)~~, by a system of coordinates ~~(22)~~; and

~~it~~ the system additionally comprises ~~said~~ third calculation means ~~(52)~~ for:

defining, for a given coordinate ~~(24)~~ of the system of coordinates ~~(22)~~, a pair of ~~said~~ values ~~(25, 26)~~, ~~of which the~~a first value ~~(25)~~ ~~is the~~of the pair being a value appearing in the reference index ~~(10)~~ associated with the given coordinate ~~(24)~~, and ~~of which the~~a second value ~~(26)~~ ~~is the~~of the pair being a value appearing in the current index ~~(14)~~ associated with the given coordinate ~~(24)~~,

calculating ~~the~~ a bidimensional histogram ~~(27)~~ of the pairs of values ~~(25, 26)~~ obtained for all the coordinates of the system of coordinates ~~(22)~~ of the reference index ~~(10)~~ and the current index ~~(14)~~,

calculating ~~the~~ a discrete entropy of the bidimensional histogram, hereinafter called the entropy of the bidimensional histogram ~~(28)~~,

calculating a comparison distance ~~(29)~~ between ~~a~~ the reference index ~~(10)~~ and ~~a~~ the current index ~~(14)~~, using the reference marginal entropy ~~(50a)~~, the current marginal entropy ~~(50b)~~ and the entropy of the bidimensional histogram ~~(28)~~,

~~detecting~~ whereby a specific image ~~(11)~~ within ~~a~~ the flow ~~(3)~~ is detected with ~~great~~ precision and ~~extremely fast~~speed, while being robust during major photometric alterations.

8. (Currently Amended) ~~System~~ A system in accordance with claim 7~~; the system being such that~~ wherein the first calculation means ~~(38)~~ for calculating a reference index ~~(10)~~ of a specific image ~~(11)~~ comprises:

~~said~~ sampling means ~~(45)~~ for resampling the specific image ~~(11)~~ as a resampled specific image with fixed dimensions ~~in advance~~,

~~said~~ means for discrete quantization ~~(46)~~ of the pixel values of the specific image ~~(11)~~ resampled ~~in such a way that~~wherein the resampled specific image ~~(11)~~ ~~resampled~~ is represented by a matrix ~~(19)~~ of ~~the~~ pixel values ~~(17)~~, after discrete quantization;

~~said~~ sequencing means ~~(47)~~ for arranging the pixel values ~~(17)~~ according to a predetermined running order of ~~the~~ positions ~~(18)~~ in the matrix ~~(19)~~, ~~and in particular by concatenating the values of each line of the matrix (19) in the form of a characteristic vector (9a),~~ so as to obtain the reference index ~~(10)~~;

wherein the system additionally ~~comprising~~comprises, if the specific image ~~(11)~~ is a color image ~~(6)~~ ~~comprising~~ including levels of colors, ~~said~~ conversion means ~~(48)~~ for converting the levels of colors of the specific image ~~(11)~~ to be resampled to levels of grayscale ~~beforehand~~.

9. (Currently Amended) ~~System~~ A system in accordance with any of the claims 7 and 8~~; the system being such that~~, wherein the second calculation means ~~(43)~~ for calculating a current index ~~(14)~~ of a current image ~~(13)~~ comprises:

~~said~~ current image sampling means ~~(45)~~ for resampling the current image ~~(13)~~ as a current image ~~(13)~~ with fixed dimensions ~~in advance~~,

~~said~~ current image quantization means for discrete quantization ~~(46)~~ of the pixel values of the current image ~~(13)~~ ~~in such a way that~~wherein the resampled current image ~~(13)~~ is represented by a matrix ~~(19)~~ of ~~the~~ pixel values ~~(17)~~, after discrete quantization;

~~said~~ current image sequencing means ~~(47)~~ for arranging the pixel values of the current image according to a predetermined running order of ~~the~~ positions ~~(18)~~ in the matrix ~~(19),~~

~~and in particular by concatenating the values of each line of the matrix (19) in the form of a characteristic vector (9b),~~ so as to obtain the current index ~~(14)~~;

wherein the system additionally ~~comprising~~comprises, if the current image ~~(13)~~ is a color image ~~(6)~~ ~~comprising~~ including levels of colors, ~~said~~ current image conversion means ~~(48)~~ for converting the levels of colors of the current image ~~(13)~~ to be resampled to levels of grayscale ~~beforehand~~.

10. (Currently Amended) ~~System~~ A system in accordance ~~with one of the claims~~with claims 7 or 8~~through 9~~, in which the third calculation means calculate the comparison distance ~~(29)~~ between ~~a~~ the reference index ~~(10)~~ and ~~a~~ the current index ~~(14)~~, by forming ~~the~~ a ratio between ~~the~~ a sum of the reference marginal entropy ~~(50a)~~ and ~~of~~ the current marginal entropy ~~(50b)~~ reduced by the entropy of the bidimensional histogram ~~(28)~~ as the numerator and ~~the~~ a sum of the reference marginal entropy ~~(50a)~~ and the current marginal entropy ~~(50b)~~ as the denominator.

11. (Currently Amended) System in accordance with claim 10; ~~the system being such that~~wherein, to extract the reference indexes ~~(10)~~ of said specific audiovisual sequence ~~(2)~~ from the specific audiovisual sequence ~~(2)~~, made up of said specific images ~~(11)~~, ~~it~~ the system additionally comprises ~~said~~ fourth calculation means ~~(53)~~ using a calculation algorithm ~~(54)~~ comprising a step of initializing a reference set ~~(30)~~ containing the reference indexes ~~(10)~~ of the specific images ~~(11)~~ with the reference index ~~(100)~~ of the first specific image ~~(110)~~ of the specific audiovisual sequence ~~(2)~~; the reference index ~~(100)~~ of the first specific image ~~(110)~~ of the specific audiovisual sequence ~~(2)~~ constituting the first reference index of the reference set ~~(30)~~;

the calculation algorithm ~~(54)~~ additionally comprising:

(a) ~~the step of~~ calculating, for each said specific image ~~(11)~~ of the specific audiovisual sequence ~~(2)~~, a temporary current index ~~(31)~~ and ~~of~~ calculating a comparison distance ~~(29)~~ between the temporary current index ~~(31)~~ and ~~the~~ a last reference index ~~(32)~~ added to the reference set ~~(30)~~;

(b) ~~the step of~~ comparing the comparison distance ~~(29)~~ between the temporary current index ~~(31)~~ and the last reference index ~~(32)~~ added to the reference set ~~(30)~~ to a predetermined threshold SE ~~(33)~~;

(c) ~~the step of~~ adding the temporary current index ~~(31)~~ to the reference set ~~(30)~~, if the comparison distance ~~(29)~~ exceeds the predetermined threshold SE ~~(33)~~; the temporary current index ~~(31)~~ becoming the last reference index ~~(32)~~ of the reference set (30); and

the calculation algorithm ~~(54)~~ additionally comprising the step of repeating the steps (a) through (c) up to the end of the specific audiovisual sequence ~~(2)~~.

12. (Currently Amended) ~~System~~ A system in accordance with ~~any of the claims~~ claim 10 ~~or 11; the system being such that~~, wherein the third calculation means ~~(52)~~ compares the comparison distance ~~(29)~~ between the reference indexes ~~(10)~~ and the current index ~~(14)~~ of the current image ~~(13)~~ of the ~~monitored~~ flow ~~(3)~~ to a further predetermined threshold SF ~~(65)~~; and

~~in such a way that~~wherein in the case of ~~any~~ said flow ~~(3)~~ of said images ~~(6)~~, the specific image ~~(11)~~ is detected provided that the comparison distance ~~(29)~~ between the reference index ~~(10)~~ of the specific image ~~(11)~~ and the current index ~~(14)~~ is less than the further predetermined threshold SF ~~(65)~~.

13. ~~System~~ A system in accordance with claim 11~~;~~, the system being ~~more particularly~~ designed for detecting a specific audiovisual sequence ~~(2)~~ within ~~any~~ said flow ~~(3)~~ of said audiovisual sequences ~~(7)~~;

the system comprising:

~~said~~ initialization means ~~(57)~~ for loading:

~~the~~ a value -1 in a first register T ~~(55)~~, and

~~the~~ a value 0 in a second register D ~~(56)~~;

the system additionally comprising ~~said~~ fifth calculation means ~~(58)~~ for calculating, for each said reference index ~~(10)~~ of the reference set ~~(30)~~, ~~the~~ a further comparison distance ~~(29)~~ between the reference index ~~(10)~~ of the reference set ~~(30)~~ and the current index ~~(14)~~; ~~in such a way that~~wherein if a condition is met where the comparison distance ~~(29)~~ is less than a predetermined threshold SD ~~(59)~~, the second register D ~~(56)~~ is increased by one; the condition being hereinafter called the condition for detecting said reference indexes ~~(10)~~;

~~the system being such that~~wherein ~~the~~ a moment when the first reference index ~~(10)~~ of the reference set ~~(30)~~ of the specific audiovisual sequence ~~(2)~~ meets the detection condition is hereinafter called the moment of the first detection;

~~the~~ fifth calculation means ~~(58)~~ being ~~equipped for loading~~configured to load, in the first register T ~~(55)~~, the time elapsed ~~since~~ at the moment of the first detection if the value stored in the second register D ~~(56)~~ is different from zero;

the fifth calculation means ~~(58)~~ being ~~equipped for repeating~~configured to repeat the calculation of the comparison distance ~~(29)~~, until the value stored in the second register D ~~(56)~~ reaches the predetermined threshold SD ~~(59)~~, or for repeating the use of the initialization means ~~(57)~~ if the value stored in the first register T ~~(55)~~ exceeds a predetermined threshold ST ~~(60)~~,

~~in such a way that~~whereby the specific audiovisual sequence ~~(2)~~ is detected if the value stored in the second register D ~~(56)~~ reaches the predetermined threshold SD ~~(59)~~.